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Attending to the Process of Changing Behavior: A Reply to Ives' Commentary

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In our article, "The *Feldenkrais Method*®: A Dynamic Approach to Changing Motor Behavior" (Buchanan & Ulrich, 2001), our stated objectives were to offer a tutorial on the *Feldenkrais Method* of somatic education based on the writings of Moshe Feldenkrais and suggest several parallels with dynamic systems theory. Briefly, *Feldenkrais* teachers and dynamic systems theorists believe that humans self-organize their behavior from the interactions among their individual resources, environment, and task requirements. Both groups acknowledge that behavior often assembles into preferred or habitual patterns of varying stability. Changing an existing behavior requires perturbation or a relative destabilization to create conditions for the reassembly of a related or different behavior. *Feldenkrais* and dynamic systems theory explicitly view system behavior as emerging from the interactions of multiple subsystems and strongly believe in a continual coupling between perception and action. As a corollary to our objectives, we hoped to interest researchers in conducting well designed studies of *Feldenkrais* and its fundamentals from an overt theoretical foundation. We briefly reviewed studies published in peer-reviewed journals and acknowledged the limitations of many of them before we proposed several studies formulated from a dynamic systems theoretical perspective. We do not believe anything in Ives' commentary substantively suggests we failed to hit our mark.

Ives had four major elements in his paper. He (a) provided a more detailed review of the literature, (b) concluded that most studies were not very well controlled or designed, (c) concluded that the empirical evidence supporting the effectiveness of *Feldenkrais* is limited, and (d) suggested an alternative theoretical basis for understanding select instances in which *Feldenkrais* seems to be an effective intervention. We will comment on each of these elements in relation to the stated purposes of our paper.

The opening and major section of Ives' commentary is an extended literature review of *Feldenkrais*-related studies. This is a welcome addition to the literature that our manuscript's space limitations did not allow. He supported our conclusion that there is considerable room for improvement in many of the extant publications, a large portion of which are not printed in mainstream motor behavior journals. Later in his closing, Ives pointed to methodological factors of seemingly special application to *Feldenkrais* studies. He expressed concern about practitioner skill level, subjective assessments, selection of measures, participant self-reports, and expectancy effects of both participants and researchers. While we agree that these are important considerations in research design, we view them as standard considerations for any intervention study that are not unique to *Feldenkrais* research. Nevertheless, we concur with Ives' encouragement of readers to seek out the original articles, review the articles, and form their own opinions regarding the quality of the experiments and the measured outcomes.

We find Ives' summary of his review of the published research puzzling; he concludes both that *Feldenkrais* is

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ineffective and effective. He separates the impact of *Feldenkrais* into body and mind, with its impact on physiology (body) as ineffective and psychology (mind) as effective. We strongly disagree with this dichotomy and the implication that *Feldenkrais* targets one or the other in isolation. Other dynamic systems theorists (Kelso, Fink, DeLaplain, & Carson, 2001; Thelen, Schöner, Scheier, & Smith, 2001), *Feldenkrais* teachers (Ginsburg, 1999; Reese, 1999/2000), ecological psychologists (Shaw & Turvey, 1999; Turvey & Shaw, 1999), and neuroscientists (Damasio, 1994; Damasio, et al., 2000; Freeman, 1999) have argued that physiological and psychological categories include many subsystems that interact, and, thus, affect each other. Further, emergent behaviors arise from the coalescence of the organism's subsystems (physiological, psychological, etc.), the environment, and task or goal demands.

This point of disagreement emphasizes the need to understand researchers' theoretical perspectives, as much as it is important to be aware of "therapeutic allegiances." Implicit in Ives' mind-body dichotomy is a hierarchical viewpoint that grants superiority and isolation to the brain. Perhaps this is why Ives and others are dubious of the role of kinesthesia in motor behavior, except under limited circumstances. Unlike Ives, we believe data support kinesthesia—the awareness of one's position and movement—as a critical interface in perception-action and, therefore, of human-environment self-assembly of task-specific behavior (Turvey, Burton, Amazeen, Butwill, & Carello, 1998; Turvey & Carello, 1995). Depending on circumstances, one can be at different positions along a continuum of attending to features of kinesthetic information (Gandevia & Burke, 1992). People with diminished kinesthesia, whether due to the temporary effects of anesthesia for dental work or the long-term effects of pathology, have to be more attentive to the available perceptual information to perform tasks ranging from chewing to walking safely and effectively (Cole, 1995; Nougier & Rossi, 1999). Contemporary research also shows that learning to make sense of, make use of, and focus attention on select features of one's rich kinesthetic resources is a developmental process (Davids, 1988; Gopher, 1993; Lee, Swinnen, & Serrien, 1994; Savelsbergh & Bootsma, 1994; Turvey & Fitzpatrick, 1993). From infants' early efforts to grasp interesting objects to put in their mouths to the many reaching actions adults perform throughout the day, kinesthesia plays an important role in developing a repertoire of reaching skills. Infants explore an array of reaching-intended behaviors before establishing skillful, controlled, and adaptable reaching patterns (Thelen, Corbetta, & Spencer, 1996). By the time some of these infants develop into college students participating in research studies (e.g., Ives, Abraham, & Kroll, 1999; Kelso, et al., 2001), they have practiced reaching for about 20 years under diverse environmental and task conditions. Courtesy of this extensive apprenticeship, most of us can easily continue to read the words on this page and reach for a nearby cup to take a drink. Performing such a familiar task requires little conscious attention to our actions. However, if we were learning a new phrasing on the piano keyboard, attempting to tap our fingers in a nonrepetitive sequence (Jueptner, Frith, Brooks, Frackowiak, & Passingham, 1997), or developing a set of skills to expert level, it would be useful to be more aware of and attentive to kinesthetic clues about our actions (Stein, 1992), which would concurrently increase brain activity in multiple regions (Jueptner & Weiller, 1998; Stein, 1992). The result of such attentive practice is a wealth of task-specific information about one's actions relative to surroundings that facilitates development of highly refined, stable, yet adaptable skills.

We believe there is research support for the importance of attention and kinesthesia that varies with the individual's level of experience, available resources (including motivation), and familiarity with the current task. Our perspectives about kinesthesia and attention are consistent with dynamic systems theory and *Feldenkrais*. Conversely, Ives was dubious of the role of attention and kinesthesia in motor behavior and disputed the efficacy of *Feldenkrais* for changing motor behavior. He briefly suggested an alternative framework—self-regulation theory—for explaining the effectiveness of *Feldenkrais* within the psychological realm. It seems quite likely that efforts to self-regulate one's behavior would draw attention to one's body position, actions, and other sensations. These features are not outside the scope of *Feldenkrais* or dynamic systems. Nevertheless, we encourage people to act on our suggestions: establish well designed, theoretically based studies to test the impact of *Feldenkrais* techniques on behavior and publish in refereed journals. Just as we outlined a framework for testing if and how *Feldenkrais* can change behavior in ways best explained by dynamic systems theory, researchers with other theoretical perspectives should do the same. Proponents of self-regulation theory must carefully design and conduct experiments to determine if *Feldenkrais* can affect the psychological domain without impacting the physiological realm in a manner best explained by that theory. Equally important would be to test the generalizability of both application (*Feldenkrais*) and theoretical explanation (self-regulation, dynamic systems, or others) across behaviors that might range in complexity from simple, quiet standing to ambulating to negotiating a path around defenders during a soccer game. As we originally argued in our article, the results of research endeavors of this nature should be of interest to movement science theorists and clinicians alike.

We appreciate Ives' interest in our article in which we provided an overview of the *Feldenkrais Method*, proposed parallels with dynamic systems theory, suggested theoretically driven research studies, and encouraged researchers to develop their own well designed experiments to test the validity of the *Feldenkrais Method*. Ives' commentary testifies that our efforts were at least partially successful: people have read and thoughtfully considered the implications of our discussion of the *Feldenkrais Method*. We hope researchers will take the next step and focus their attention on carefully designing studies of the impact of *Feldenkrais* on motor behavior from expressly stated theoretical perspectives.

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